



North Dakota Department of Health

The North Dakota Department of Health (NDDoH) requests immediate reporting of all suspected cases of anthrax by telephone. The NDDoH will discuss the case history with you and determine the likelihood of anthrax infection, and help arrange appropriate laboratory testing.

Clinical Description of Anthrax:

Cutaneous anthrax:

- Usually begins as a small papule
 - Enlarges and progresses to a vesicle or bulla in 1-2 days
 - Vesicles may become hemorrhagic, with satellite vesicles
 - Lesion then ulcerates and forms a black eschar (necrotic ulcer) in 3 to 7 days
- The lesion is usually painless and the tissue surrounding the skin lesion is often erythematous, and may have varying degrees of edema (brawny, gelatinous, non-pitting edema).

Patients may initially experience:

- Fever
- Malaise
- Headache
- Regional lymphadenopathy

The case fatality for cutaneous anthrax is 20% without antibiotic treatment and $\leq 1\%$ with antibiotic treatment. Cutaneous anthrax is not easily transmissible from person to person, although there is a very low risk of infection if there is direct contact with the drainage from an open sore. The incubation period is usually from 1-7 days, but may range up to 15 days.

Inhalational anthrax:

- Usually presents as a brief prodrome resembling a viral respiratory illness
- Followed by development of hypoxia and dyspnea
- Radiographic evidence of mediastinal widening

Patients may initially experience

- Mild fever
- Muscle aches
- Malaise
- May progress to respiratory failure and shock.
- Meningitis frequently develops, and the spinal fluid may be hemorrhagic

Inhalational anthrax requires inhaling an infectious dose of 8,000-40,000 spores of *B. anthracis*. The incubation period of inhalational anthrax among humans is unclear, but it is reported range between 1 and 7 days, and on rare occasion can extend out to 60 days post exposure. Case-fatality is extremely high, even with all possible supportive care including appropriate antibiotics. Early treatment in the prodromal stage is proving effective in preventing severe illness and death.



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REPORT PATIENTS WITH ANY OF THE FOLLOWING CLINICAL SYNDROMES:

A suspicious case of cutaneous anthrax is defined as:

1. Any person with a **highly suspicious skin lesion**:
 - a. An ulcerative lesion with surrounding erythema, edema, or vesicles
AND/OR
 - b. A blackened eschar forming 3 to 7 days after onset of skin lesion

2. Any person with a **less suspicious skin lesion**:
 - a. An ulcerative or necrotic lesion
AND
 - b. A risk exposure history. Some examples of suspicious exposures at this time are:
 1. Occupational: Any of the following occupational exposures, particularly if the person handles mail: (a) a person who works in a media outlet, (b) a postal worker, or (c) a person who works in a high-profile setting (*e.g., government agency, large corporation, public institution or religious organization*).
 2. Powder exposure: A history of exposure to a threatening letter with powder

3. Any person with a **less suspicious skin lesion**:
 - a. An ulcerative or necrotic lesion
AND
 - b. Laboratory evidence suggestive of possible *B. anthracis* infection. Examples include:
 1. Encapsulated gram positive bacilli from a skin lesion, sterile fluid, or tissue
 2. Culture of non-motile, non-hemolytic, spore-forming gram positive bacilli from any body fluid or site

All patients with a skin lesion characteristic of cutaneous anthrax, with or without a known exposure, should be treated presumptively with antibiotics until laboratory testing is completed. Ciprofloxacin or doxycycline should be given until susceptibilities are known. If susceptible, penicillin or amoxicillin are acceptable alternatives. If laboratory testing is positive for cutaneous anthrax, treatment should continue for 7-10 days (treatment may need to be extended for 60 days if there was a known aerosol exposure).

A suspicious case of inhalational or meningeal anthrax is defined as a patient with:

1. Sepsis or respiratory failure with a widened mediastinum,
2. Sepsis with gram-positive rods **OR** a suspicious *Bacillus species* identified in blood or cerebrospinal fluid.



HOW TO REPORT A SUSPICIOUS CASE OF ANTHRAX:

Call the NDDoH immediately at 1-800-472-2180 toll free. This number is available 24 hours a day, 7 days a week. Disease Control epidemiologists will be available for questions, recommendations or consultation.

Please have the following information available:

- Patient name
- Patient contact information
- Medical history
- Illness onset date
- Characteristics and progression of skin lesion
- Presence of systemic symptoms
- Treatment history
- Laboratory and radiologic data
- Detailed exposure and employment history

This information will be used to help determine the patient's risk for anthrax infection. When you call to report a case, we will help to determine whether further testing is necessary.

HOW TO ARRANGE FOR TESTING:

A. If it is determined that the patient is a SUSPICIOUS CASE OF CUTANEOUS ANTHRAX the patient should be evaluated and the specimens detailed below should be requested. Initial laboratory testing for cases should be performed using local clinical reference laboratories.

1. Cultures and gram stains for testing at your routine microbiology laboratory:
 - a. Synthetic (non-cotton) swab with non-wooden stick for culture and gram stain of material swabbed from the exudate or the most actively inflamed area of the eschar.
 - b. Sterile punch biopsy specimen sent in sterile saline for culture.
 - c. Blood culture.
 - d. All specimens should be sent to local clinical reference laboratory. If suspicious *Bacillus species* is identified, contact NDDoH immediately.

B. If it is determined that the patient is a SUSPICIOUS CASE OF INHALATIONAL ANTHRAX the diagnostic workup should include the tests listed below. Initial laboratory testing for cases should be performed using local clinical reference laboratories.

1. Gram stain and routine blood cultures
2. If meningeal signs are present, gram stain and culture of CSF.
3. If pleural fluid is present, gram stain and culture of pleural fluid
4. Chest X-ray and/or chest CT to assess for mediastinal and hilar adenopathy

TEST RESULTS

All test results will be reported to the physician immediately.



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Laboratory Testing Available

Environmental Samples

- All environmental samples should be sent to the ND Public Health Laboratory (NDPHL) for testing.

Clinical samples

- **Clinical Reference Laboratories**

- ♦ Thirteen clinic reference laboratories located in Bismarck, Dickinson, Fargo, Grand Forks, Minot and Williston are equipped to conduct initial diagnostic testing (gram stain and culture) to detect *Bacillus species* and rule out *B. anthracis*.
- ♦ The clinical reference laboratories are as follows:

Bismarck

- MedCenter One
- St. Alexius Medical Center

Dickinson

- St. Joseph's Hospital

Fargo

- Dakota Clinic
- Dakota Heartland Health System
- Innovis Health
- Meritcare
- VA Medical Center

Grand Forks

- Grand Forks Air Force Base
- Altru Hospital

Minot

- Minot Air Force Base
- Trinity Hospital

Williston

- Mercy Hospital

Samples for testing include:

- Blood (inhalational, cutaneous, or gastrointestinal anthrax)
 - Sputum (inhalational anthrax)
 - Spinal fluid (inhalational anthrax)
 - Lesion exudate/aspirate (cutaneous anthrax)
 - Biopsy specimen (cutaneous anthrax)
 - Stool (gastrointestinal anthrax)
- ♦ If *Bacillus species* is detected and *B. anthracis* cannot be ruled out, samples should be sent to the NDPHL for confirmation.

- **North Dakota Public Health Laboratory**

Tests performed at NDPHL for confirmation of *B. anthracis* include:

- Capsule visualization (requires overnight incubation)
- Gamma-phage lysis (requires overnight incubation)
- Direct fluorescent antibody (DFA) assays for cell wall-associated polysaccharide and capsular antigens (requires approximately 5 hours from the time that growth is observed in the culture)
- Antibiotic susceptibility testing on all positive *B. anthracis* cultures.